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Activated carbon supported cobalt based catalyst for direct conversion of  
5 synthesis gas to diesel fuels

### Abstract

10 Diesel fuels or blending stocks having high cetane number are produced  
from non-shifting Fischer-Tropsch processes, which directly convert carbon  
monoxide and hydrogen to diesel distillates over activated carbon supported  
cobalt based Fischer-Tropsch catalysts. The activated carbon supported cobalt  
based catalysts comprise a substantially high dispersion of at least one of a  
15 zirconium component, an cerium component, a ruthenium component or a  
potassium component in porous carbon and elemental cobalt either deposited  
thereon or substantially uniformly dispersed therein, wherein the concentration of  
activated carbon in the catalyst is from about 20 to about 90 percent by weight,  
based on the weight of the catalyst, the concentration of elemental cobalt in the  
20 catalyst is from about 4 to about 50 percent by weight, based on the weight of the  
catalyst, the total concentration of the zirconium component, the cerium  
component, or a combination thereof in the catalyst is from about 0.01 to about 20  
percent by weight, based on the weight of the catalyst and calculated as the  
elemental metal or metals, and the total concentration of the ruthenium  
component, the potassium component, or a combination thereof in the catalyst is  
25 from about 0.01 to about 5.0 percent by weight, based on the weight of the  
catalyst and calculated as the elemental metal or metals. Activated carbon carrier  
has a surface area in the range of about 200-2000 m<sup>2</sup> /g, preferably 800-1500 m<sup>2</sup>  
/g, and a pore volume of 0.3 to 2.0 ml/g, preferably 0.35 to 0.75 ml/g, a  
distribution of pore diameter of 4 to 1000 Å, preferably 5 to 500 Å.